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Cedrus libani at Kew

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Arboretum Activities

THE STAFF

On August 24 the Director attended the Annual Meeting of the American Association of Botanical Gardens and Arboretums which took place in Asheville, N. C. In September he flew to Paris to participate in a two-day session of the International Council of Scientific Unions Abstracting Board. This trip also provided an opportunity to visit the International Exposition at Brussels.

Dr. Hui Lin Li, Taxonomist, is actively pursuing his studies on the Trees and Shrubs of Formosa, a project which is supported by a grant from the National Science Foundation. In connection with this work Dr. Li has recently visited the Gray Herbarium of Harvard University, the Hebarium of the New York Botanical Garden and the U. S. National Museum in Washington. On Thursday, October 9, Dr. Li addressed the Pennsylvania Garden Symposium on "The Influence of Oriental Plants on Early Pennsylvania Gardens." Dr. Li's paper will appear in a future issue of this Bulletin.

Dr. Patricia Allison, Pathologist, represented the Arboretum at the annual meetings of the American Institute of Biological Sciences which were held in Bloomington, Indiana, from August 24 to 28. This was also the occasion of the Jubilee Meeting of the American Phytopathological Society.

(Continued on Page 65)

Three Botanical Gardens of Britain

HUI-LIN LI

In the Fall of 1957, while on a study trip to the British Isles, I attempted, in the limited time at my disposal, to visit several leading botanical gardens. My British colleagues assured me that the three largest and best ones are, in this order: The Royal Botanic Gardens at Kew and at Edinburgh and the University Botanic Garden at Cambridge. After seeing these three and a few other gardens I fully agree with this evaluation and heartily recommend that all botanically-minded visitors to these islands make an effort to visit these institutions. No attempt will be made here to give an account of their history and present status, but only to discuss certain of their noteworthy features.

These three institutions are all botanical gardens in the traditional sense. In such gardens, in addition to outdoor plantings, extensive greenhouses are maintained for tropical or tender plants, museums of economic or ethnobotany are also maintained and there is usually a herbarium where basic research is carried on in taxonomy and related fields. In the outdoor plantings, species are arranged in various ways to show taxonomic, geographic or habitat groupings and the arboretum, while usually taking up the major portion of the ground surface, is only one kind of collection in addition to the inevitable rock garden. Botanical gardens seem to furnish an index to the cultural standards of a European city, for almost all leading ones, as well as many smaller ones, with a major university, have a botanical but not necessarily a zoological garden.

Fig. 34. Kew Gardens—View of Temperate House and Australian House (left).

Fig. 35. Kew Gardens—Interior of Temperate House.

We visited these gardens in the fall when few trees and shrubs were in bloom. Although a few kodachromes were taken, the more desirable views were not successfully recorded on account of the constantly overcast or rainy sky. In order to do justice to these beautiful gardens, the illustrations here presented were obtained from their official files; the generosity of the Directors of these gardens in making available these photographs with permission to publish them here in this Bulletin is here acknowledged with gratitude.

KEW GARDENS

The famed Kew Gardens, known to everybody interested in botany, needs little introduction. It is not only the best known botanical garden of the world, but its extensive herbarium and taxonomic library, the largest of their kind, render it the mecca of all plant taxonomists.

Fig. 36. Kew Gardens—Palm House.

The official name is the Royal Botanic Gardens, Kew. The Gardens date back to 1759 when Princess Augusta started a botanical garden of about nine acres in her private domain at Kew House. The House as well as most of the original trees have long since disappeared, but among the few surviving is a large Maidenhair tree, *Gingko biloba*. This ancient species from Asia is a "must" for every botanical garden and I was most interested to observe here the incipient stage of development of a branch hanging from the lower limb close to the trunk. This is a peculiar feature of Ginkgo, called *chi-chi* or *"nipple"* by the Japanese, a phenomenon occurring only on trees of great age. Eventually these branches will touch the ground and develop roots.

The extensive area of Kew covers over 300 acres. I was greatly impressed by the efforts which are made to preserve the place for botanical usage. The whole area is walled, and there is a small nominal charge for admittance. There are over forty guards on duty. Large billboards inside the entrances clearly inform visitors that games, picnics, bicycling and other such activities are prohibited; there are even signs on trees saying that nesting of birds is not allowed! No motor vehicles are used, even by the working crews, on the many wide well-paved roads. The guide book emphatically states that the gardens primarily serve scientific purposes and their use as a place of recreation, as thought of by most of those who come, is only incidental. Great care is certainly taken to maintain the place as a scientific establishment.

In the outdoor collection, most notable are the numerous beautiful specimen trees of great age and size seldom observed in the younger American botanical gardens and arboretums. Besides the huge Ginkgo, there are magnificent specimens of Atlas Cedar, Cedar of Lebanon, Stone Pine (*Pinus Pinea*), Swamp Cypress, Black Locust, *Sophora japonica*, Oaks, Ashes, Elms, Hollies, and numerous others. Walking under and among these wonderful old trees makes one realize why safeguarding the collections is of the utmost importance.

Not only are the grounds extensive, but there are so many special collections or areas worth visiting that it would take several days of intensive viewing to cover the outdoor living collections alone. There is the Rhododendron Dell, containing many rare species from the Himalayas and elsewhere. The Bamboo Garden is not only very pretty to behold but was of especial nostalgic import to me. The Herbaceous Garden is a long series of beds with all kinds of herbaceous flowers, sedges and grasses. The Wild Garden is a meadow with wild flowers. There are gardens for special habitats such as the Chalk Garden for plants preferring limey soil, the Rock Garden for alpine plants and the Aquatic Garden for water plants.

The numerous glass houses are another distinguished feature of the garden; I suppose nowhere else in the world can one see so many kinds of living plants growing together under glass. There are large conservatories for general collections, a temperate house for warm temperate plants, and economic houses for important economic plants of tropical or subtropical origin. There are special houses for palms, aroids, ferns, succulents, orchids, alpines and waterlilies. To me the most interesting is the Australian House because of its collection of unusual plants from that distant continent. (Figs. 34, 35 & 36).

Days can also be spent in the four museums which house many interesting displays of plant specimens and products of botanical, economical or ethnobotanical significance. (Fig. 37). For the less botanically-inclined there are a number of old buildings of historical interest such as the Dutch House or Kew Palace and various others.

Fig. 37. Kew Gardens—Museum No. 1.

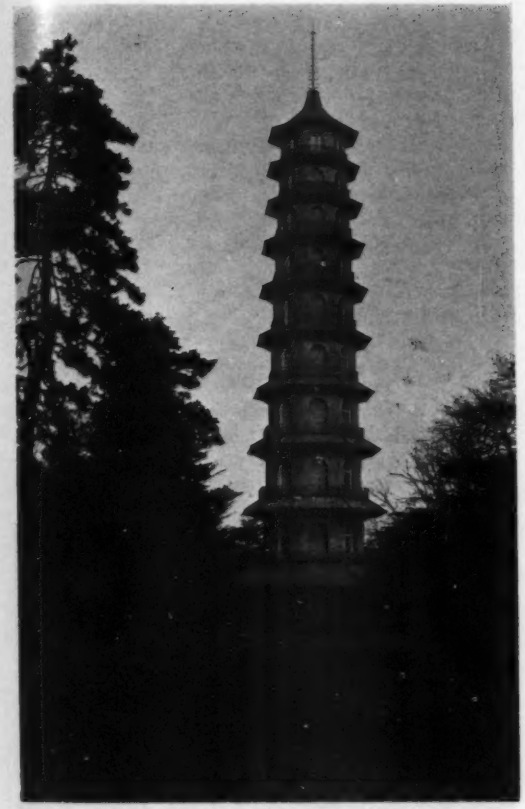

Fig. 38. Kew Gardens—Chinese Pagoda.

Among these are also two Oriental structures. The Chokushi Mon is a replica of a famous Japanese Gate, a beautiful structure with exquisite carving. Less to be commended, although it is perhaps the most notable and famed building of Kew, is the Pagoda. It was built in 1761-62, when Chinese gardening was at the height of its popularity in Europe. Although the general outline is Chinese, the details such as texture of wall, design of windows, shapes of roofs, etc., are too distinctly occidental in appearance. (Fig. 38).

Kew is indeed a wonderful place. There one can spend a whole day with the family, enjoy the beauty of nature and absorb botanical knowledge consciously or unconsciously. Aside from being an important center of botanical research, the value of Kew as a place for educating the general public is enormous. The high cultural level of Britain can be seen in that, although public parks abound, there are always long lines of people, especially on Saturdays and Sundays, waiting to gain entrance to Kew by paying for admittance.

Edinburgh Garden

At Edinburgh there is also a Royal Botanic Garden, much smaller in scope than Kew but quite similar in set-up. The garden was first founded in 1667. There was a succession of moves until it reached the present beautiful hilly site of over 50 acres to the north of the city. At the center of the garden high upon the hillside, it commands a magnificent view of the capital.

Edinburgh also has a famed herbarium, well known especialy for the collections of Forrest and others from western China. The researches conducted there on alpine Chinese-Himalayan plants, especially on *Primula* and *Rhododendron*, are among the most distinguished. These and other alpine plants are also most prominently represented in their outdoor collections. (Fig. 39). The vast collection of temperate Asiatic plants is the specialty of Edinburgh and was of particular interest to me.

There are many distinct features of Edinburgh. The Rock Garden is of course most famous. This large garden is noticed by the visitor as soon as he enters the gate. The wealth of alpine plants planted here is incomparable. (Figs. 40 & 41). According to the present director of the garden, Dr. Harold Fletcher, this vast pile of rock work, which took many years to build, is now considered rather an ugly structure. However, when the numerous alpine plants are in bloom, they nearly cover up the rock work and the whole thing is beautiful to see.

I have hitherto refrained from commenting on the rock garden of Kew. Although I have heard favorable comments on the one at Edinburgh which is more extensive, I have not heard similar comments as regards the one at Kew from those who have visited both. In general the rock work

Fig. 39. Edinburgh Garden—The azaleas in June.

Fig. 40. Edinburgh Garden—A general view of the Rock Garden.

of most rock gardens in Britain, to my eye, lacks imagination. The rocks are nearly all laid flat, piled up in more or less regular rows or terraces. True, there is a fundamental difference in the rock gardens of the East and the West. In the West the rock garden is only something to provide a suitable abode and background for the plants. But even primarily aimed for growing plants, a rock garden can be constructed in a more artistic and attractive manner. It should be possible, I think, to strike a balance between the East and West where rock gardens are concerned.

The Woodland Garden is a most pleasant sight, and reflects great skill in gardening and landscaping. This is developed from old stands of conifers, which in general are not doing well in the sooty atmosphere of Edinburgh. By judicious thinning and skillful planning, the open spaces are now filled with rhododendrons, primroses, lilies, and others, presenting a delightful

Fig. 41. Edinburgh Garden—The northern aspect of the Rock Garden with the scree.

sight. The Heath Garden, specially constructed with peat for the growing of ericaceous plants, is another interesting and beautiful feature. (Fig. 42).

At Edinburgh neither greenhouses nor all other features can be compared in extent with Kew. But with its more interesting terrain and excellent layout, there is a distinct charm in this garden.

Cambridge University Garden

The Botanic Garden of Cambridge University now occupies a site of about 20 acres. It had its origin in another site, smaller than this, started in the 1760's. The old garden was removed to the present location in 1846. The ground is level, but with a lake and a mound, built up from the material dug from the lake and made into a rock garden, the flatness of the

Fig. 42. Edinburgh Garden—The Peat Garden, with woodland in the background.

area is not too conspicuous. (Figs. 43, 44 & 45).

Since the war, and upon the receipt of a sizable bequest, the garden has been continuously carrying out new developments and improvements. This rebuilding process was very evident when we visited the garden. The rock garden was then completely being overhauled. The garden is also expanding in size by reacquiring the other 20 acres originally alloted to it a hundred years ago. Among the new features in development is a Winter Garden. This consists of regularly arranged beds surrounded by a hedge and planted with species that will be in flower or in fruit at Christmas time. (Fig. 46).

According to the authorities of the garden, the dry gravelly soil, the low rainfall, and the sunny summers and rainy winters all make the place especially suitable for certain types of plants, such as those from the Mediterranean, Western Asia and California, but not for many others

Fig. 43. Cambridge Botanic Garden—The lake, with *Prunus avium* 'flore pleno'.

Fig. 45. Cambridge Botanic Garden—The Rock Garden with Japanese Cherry.

such as rhododendrons and related genera, except in specially prepared beds.

Although the climate and soil are also considered not suitable for conifers in general, there are unusually fine specimens of *Pinus monophylla* (*P. cembroides* var. *monophylla*) and *Juniperus phoenicea*. Both Red Wood and Big Tree are grown there. Among the other notable large trees are European Hornbean (*Carpinus Betulus*), Alders, Cedar of Lebanon, Atlas Cedar, and an interesting great thicket of *Pterocarya fraxinifolia*, the Caucasian Wing-nut.

Among the other interesting features are a Water Garden by the edge of the lake and beds of herbaceous or small woody plants arranged systematically. The greenhouses include a temperate house, a palm house, a fern house, an orchid house, a succulent house, etc. These houses, forming a range, have in between them bays which are exposed to the southern sun. These bays, protected from the cold winds, offer ideal locations for many subtropical or warm temperate plants ordinarily tender in that part of England. It is interesting to see growing here in the open New Zealand Veronicas, Crinums and other plants of the Southern Hemisphere and the tropics.

To a botanist in many parts of England it is striking to observe many plants that are not hardy in the Philadelphia area but can be grown outdoors here. At Cambridge, there are large clumps of *Ephedra*, large specimens of *Garrya*, a California plant, and the Palm *Trachycarpus excelsa*, all interesting and unusual. The last named is the hardiest of all palms and the only one which will survive in ordinary parts of England. It is of special interest to us because it is also planted in our native town Soochow in eastern China although it is indigenous further south. It will be interesting to find out whether this palm can also survive the winter

Fig. 44. Cambridge Botanic Garden—Limestone Rock Garden, with Metasequoia in the foreground.

Fig. 46. Cambridge Botanic Garden—The recently constructed Winter Garden, *Prunus Davidiana* 'alba' in flower, *Crocus* species underneath

of Philadelphia if certain hardier strain can be selected and grown in protected spots as is done with *Camellia japonica,* Fig, and a few other plants.

It is evident to the visitor that the Cambridge garden is now undergoing active rebuilding. With the aid of new resources, many new developments are being planned. Aside from the Winter Garden, a new herbaceous border, an ecological area, a herb garden, a new laboratory, greenhouses and other features are being planned or developed. In a few years, the Cambridge garden will surely become one of the leading botanical gardens of the world.

To Eat or Not to Eat

PATRICIA ALLISON

The beams and girders of the oaks stand bare in autumn repose. Richly dark against the gray tracery of branches and ever grayer sky are the conifers, thickly needled. In the azalea meadow, the floor of the Arboretum is clean, but elsewhere the rustling wind sweepings are piled deep. Although the year is nearly over, each day still supplies a new change, a new contrast. The transience of each succeeding aspect is a large part of the appeal of the Arboretum, for it must be visited and revisited as the seasons' changes in bud, flower, and fruit arrive, pause, and disappear.

Among the most transient of all the Arboretum flora are the fruiting bodies of the fleshy fungi, yet there are individuals scattered here and there almost throughout the year. During spring, summer and fall, when warm days follow rains, the "fungus bloom" may be spectacular. The very azalea meadow that now is bare was dotted for several weeks in late summer with large puffballs, at first snow white, then tan and brown.

In the woodland along the Wissahickon there was a continuous display of gill fungi, bracket fungi, jelly fungi, and even the tiny fruiting bodies of the slime molds. Some of these were inconspicuous because of size or because they blended subtly with the forest floor or pushed up in dark places beside logs and under leaves. Others were exposed in dramatic contrast to their substrates: the alabaster shelf fungus growing from the hemlock bark, the cinnabar bracket on gray beech, the coral mound of the slime mold fruiting body on yellow, disintegrating log. Many of these will be pictured and discussed in the future, but first some other consequences of the periodic abundance of fleshy fungi must be considered.

When the "fungus blooms" come, so also come the inquiries about "mushrooms versus toadstools." This also is the season for newspaper reports of deaths from fungus poisoning. The details of the uncertainties that underlie the inquiries vary, but they usually represent suspicion of one of the commonly held opinions about fungi. Such suspicion should have been shared by the victims chronicled in the newspaper.

Orbiting satellites notwithstanding in this Scientific Age, popular ideas about fleshy fungi have remained at about the same level for centuries. Too many believe that poisonous fungi are in a group by themselves and should be referred to as toadstools; that nonpoisonous fungi are as different as cats from dogs and are called "mushrooms" (when asked what the difference between them is, the usual reply is that nonpoisonous ones are mushrooms and poisonous ones are toadstools! Who ever goes to market for toadstools anyway?)

These individuals have the matter settled and are never tempted to gather the delicacies in any forest save the supermarket jungle. They stay alive, to be sure.

Too many others, however, feel really confident that a single physical characteristic distinguishes all poisonous mushrooms from all safe ones. What this characteristic may be has been carefully hidden from all but a few persons. And so we hear, "My grandmother from the old country says thus and so, and *she* lived to be 99!" There is a different method for every old country and just about every grandmother.

There is only one *single* sure method of distinguishing the mushroom poisonous to man from one not poisonous. This is the direct method. Eat it. If you don't have to call the doctor or undertaker, it's all right. This method is definitely not on the recommended list, but the methods suggested by various folk lores can be just as lethal.

Fortunately, there are relatively few poisonous species, and chance alone has lent seeming validity to some of the old wives' tales.

There is no single distinguishing characteristic! Consequently, if one decides to go to the woods and field instead of to market for his mushrooms, common sense dictates that he be properly prepared for the expedition. A basket and an appetite are not sufficient. By far the most important equipment is a thorough knowledge of the characteristics of the common species and an equally thorough knowledge of a few of the most distinctive edible species. All doubtful collections, unless checked by an expert, should be discarded as food. This does not mean that an individual should always limit himself to a few species. The mushroom hunter may always improve his "equipment", adding more species to his desirable list as he becomes more familiar with the morphological characteristics of fungi. Never should he resort to the use of a "universal rule", no matter how tempting it should be. Below are some of the commonest misconceptions. It is followed by a list of more useful rules for the beginner, as compiled by Atkinson.

"Old Wives' Rules" (from McIlvaine)

1. There are two types of fungi: Mushrooms, which are edible, and Toadstools, which are poisonous.
2. Snails and slugs infest poisonous species only.
3. Mice, squirrels, rabbits, etc. eat only the nonpoisonous species.
4. Any mushroom growing in the dark is poisonous.
5. All nonpoisonous species have all gills equal in length.
6. All poisonous species have thin tops.
7. All poisonous species turn yellow when sprinkled with salt.
8. All poisonous species will blacken a silver spoon.
9. Any fungus which changes color when cut or broken is poisonous.
10. Any fungus which exudes milky juice is poisonous.
11. Any fungus with a bad odor, bad taste when raw (or general suspicious appearance!) is poisonous.

Helpful Aids to the Beginner

1. Reject those whish have begun to decay or are infested with insect larvae.
2. Reject all those in the button stage. Sure distinguishing characteristics are not present then.
3. Reject all with a volva, (a basal cup-like structure) or which have a scaley or closely fitting layer at the base of the stem, and rather loose warts on the pileus, (cap) especially if the gills are white.
4. Reject all with a milky juice unless the juice is reddish.
5. Reject very brittle fungi with gills nearly all of equal length, where the flesh of the cap is thin, especially those with bright caps.
6. Reject all Boleti (fleshy fungi with tubes instead of gills) in which the flesh changes color where bruised or cut, or those in which the tubes have reddish mouth, also those whose taste is bitter.
7. Reject those which have a cobwebby veil or ring when young, and those with slimy caps and clay-colored spores.

The rules above will cut out a few very desirable species and many doubtful ones. This is vastly superior to leaving in one or two deadly species. It should be added that the collector should make notes of the growth habit and habitat. He should also be sure that no part of the fruiting body is left in the soil.

Common Poisonous Species

Below is a list of the most common poisonous species. The opinion seems to be shared by many mycologists that some species may have undeserved bad reputations. It is difficult to say with certainty what has caused an illness when the offender cannot be recovered in an identifiable state. Furthermore, variations in susceptibility to toxins of consumers or genetic variations among individuals of a given fungus species contribute to considerable confusion. The grim history of certain members of the genus Amanita, however, is much clearer. Since it has been estimated that ninety per cent of all deaths due to mushroom poisoning are caused by three members of this genus (1, 2 and 3 below), its characteristics are given. It is suggested that the beginner avoid all members of the genus even though a few are not poisonous. He should become familiar with the characteristics of the other genera containing poisonous species, and collect them only for practice in identification until he is confident of his knowledge of species characteristics.

1. *Amanita phalloides*
2. *A virosa*
3. *A. verna*
4. *A. caesarea (?)*
5. *A. muscaria*
6. *A. pantherina*
7. *A. rubescens (?)*
8. *Boletus satanus*
9. *B. mineato-olivaceus*
10. *Clitocybe illudens*
11. *C. morbifera*
12. *C. nebulosus*
13. *Entoloma lividum (Rhodophyllus lividus)*
14. *E. sinuatum (Rhodophyllus sinuatus)*
15. *Hebeloma spp.*
16. *Helvella esculenta*
17. *Hygrophorus conicus (?)*
18. *Inocybe infelix*
19. *I. infida*
20. *Lactarius torminosus*

21. *Lepiota Morgani*
22. *Panaeolus papilionaceus*
23. *P. retirugis*
24. *P. campanulatus*
25. *Pholiota autumnalis (Galerina autumnalis)*
26. *Russula emetica*

Members of the genus *Amanita* are recognized by the presence of both annulus (ring around the stem) and volva. Considerable skill is required to identify some species with inconspicuous volvas. The cap separates easily from the stem. All grow on the ground. The gills are free from the stem; spores are white.

The poisonous species may be divided into two general groups with respect to the action of their poisons. If members of the first group are eaten in quantiy, it is suggested that the individual write his will in addition to calling the doctor. If members of the second group are eaten, nature will probably take its course and the victim will recover after considerable discomfort.

To the first group belong *A. muscaria, A. phalloides, A. verna, A. virosa, A. pantherina, Pholiota autumnalis, Hygrophorus conicus. Inocybe infelix, I. infida,* and *Clitocybe illudens.* Because symptoms generally appear several hours after eating and after sufficient quantities of poison have been absorbed to affect the nervous system, the use of emetics and stomach pumps is of no avail. In the case of *A. muscaria,* at least two separate compounds are responsible for the symptoms. One, muscarine, causes the first signs of poisoning and depresses the heart. If atropine is administered early enough, these symptoms may be alleviated, but the drug has no effect on the other, more severe secondary symptoms involving the nervous system. Recovery depends largely on the amount of poisonous fungus consumed.

To the second group belong *Russula emetica, Lactarius torminosus, Lepiota Morgani, Entoloma lividum, Boletus satanus, B. mineato-olivaceus* and some Amanitas which cause nausea, vomiting, and diarrhea; *Helvella esculenta,* other Helvella species, and *A. rubescens,* which may cause vomiting of blood, convulsions, depression, and mild jaundice; *Panaeolus papilionaceus* and *P. campanulatus,* which cause symptoms similar to intoxication.

Further information about the symptomology and toxicology of the first group, based on work with experimental animals, may be found in McIlvaine. Wolf discusses the nature of the toxic substances, and Gussow gives case histories of poisonings. Accurate descriptions of the poisonous species are found in these books.

Choice Edible Fungi

1. *Psalliota (Agaricus) campestris* — common mushroom A Mc
2. *Coprinus comatus* — shaggy mane (when young) A Mc
3. *C. atramentarius* (when young) — common ink cap A
4. *C. micaceus* — (when young) shiny ink cap A
5. *Pleurotus ostreatus* — oyster mushroom A Mc
6. *Lepiota procera* — parasol mushroom A
7. *Armillaria mellea* — honey agaric
8. *Collibia velutipes* — violet stemmed mushroom
9. *Morchella esculenta* — morel A Mc
10. *Fistulina hepatica* — beefsteak mushroom Mc
11. *Cantharellus cibarius* — chanterelle Mc
12. *Hypholoma* spp. A Mc
13. *Lactarius deliciosus* A Mc
14. *Marasmius oreades* Mc
15. *Clitocybe multiceps* Mc
16. *Boletus edulis* A Mc
17. *Hydnum* spp. A
18. *Tricholoma personatum* Mc
19. All *Clavaria* spp. A Mc
20. All puffballs which are pure white in section A Mc

The species marked with A above are included in special recipes by Mrs. Sarah Tyson Rorer in Atkinson's book. There are special recipes in McIlvaine for those marked Mc. Gussow also includes recipes as well as a section on the culturing of fungi.

Fungi are prized more for their flavor than for their food value. Like most vegetables, they are mostly water and low in calorific value. It does appear that they rank along with some vegetables in nutritive value. A few species, as *Cantharellus cibarius,* are known to be sources of vitamin D. Others are rich in other vitamins. More work needs to be done on the food value of these plants.

This general discussion would not be complete without a brief consideration of the fungi which are poisonous to organisms other than man, and to man in different ways than mentioned above.

Of extreme importance are those which are parasitic on crop plants. Not all of the damage by fungi may be considered to be due to mechanical injury or physical disorganization of the protoplasm. Toxic substances are produced in many cases. One plant parasitic fungus, *Claviceps purpurea,* causes ergot of grains, destroying not only the grain itself, but causing severe diseases of livestock and man if eaten.

Some fleshy fungi are parasitic on others, as members of the genus *Nyctalis*, which grow on other agarics, or *Boletus parasiticus* which parasitizes certain puff balls.

Of great importance to man are those fungi which produce substances which are toxic to bacteria, as species of *Penicillium* and *Aspergillus*.

Mention should also be made of the fungi which cause diseases of man and animals. *Coccidioides immitis* causes a fatal malady of cattle, sheep and dogs. Many fungi cause serious respiratory and skin diseases of man. Two of the common, less serious skin diseases in the United States which are caused by fungi are Athlete's Foot and Ringworm.

Recommended Reading

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An Early-flowering Shrub Garden

John M. Fogg, Jr.,

The walled terrace and adjacent lawns directly behind the Gates Building have recently been cleared of their pre-existing plantings and are being transformed into a garden of shrubs which flower in late winter or very early spring. Owing to its southern exposure and protection from north winds, this location provides an ideal site for exhibiting a small number of carefully selected shrubs which may be counted upon to provide a show of color from February (or even January) to late March or early April.

Among the species which have already been established in this collection are the following:

Cornelian Cherry (*Cornus mas*). Our records, maintained over a period of fifteen years, show that this species may develop its myriads of small yellow flowers as early as February 10 and that its average date of bloom is March 12.

Japanese Cornelian Cherry (*Cornus officinalis*). This attractive Oriental cornel usually blooms at about the same time as the foregoing species; it has even been recorded as having preceded it by several days.

Winter Honeysuckle (*Lonicera fragrantissima*). This fragrant-flowered, half-evergreen Chinese shrub has been recorded as flowering here on January 17. Sporadic flowers frequently appear during warm spells in February and the plant may be relied upon to be in full bloom during the first week in March.

Standish Honeysuckle (*Lonicera Standishii*). Similar to the preceding species, but with hairy instead of smooth foliage. Blooms at about the same time.

Wintersweet (*Chimonanthus* (*Meratia*) *praecox*). Wintersweet has been reported in flower during December, January and February. It is a species which responds readily to a few warm, sunny days throughout winter, although frequently its blooms are killed by a sudden drop in temperature.

Winter Jasmine (*Jasminum nudiflorum*). This is another species which may be expected to put forth a few tentative flowers any time between mid-December and the end of February. It is usually in full bloom by March 1 and may continue to flower until the middle of the month.

Japanese Andromeda (*Pieris japonica*). An evergreen shrub with pure white, bell-shaped flowers in drooping racemes. Its earliest recorded date of bloom here is March 3, its latest April 15. In average years the plant will be seen in full bloom from the middle to the end of March.

Japanese Witch-hazel (*Hamamelis japonica*). Although our native eastern witch-hazel (*H. virginiana*) blooms in late autumn, the oriental species put forth their flowers in late winter or very early spring. *H. japonica* may be counted on to open its bright yellow corollas in early March and to furnish a display of color until the first of April.

Winter-hazel (*Corylopsis spicata*). The increasing popularity of the Winter-hazels derives from their habit of producing drooping racemes of bright yellow flowers in late March or early April. This species is among the earliest.

Spice Bush (*Lindera Benzoin*). A native of

our eastern deciduous woodlands, this shrub usually comes into bloom the third week in March, its numerous small yellow flowers persisting until mid-April.

Japanese Quince (*Chaenomeles superba*). The blood-red flowers of this quince (supposedly a hybrid between *C. japonica* and *C. lagenaria*) render it one of the most spectacular of all early-flowering shrubs.

Almond (*Prunus Amygdalus*). This old-fashioned favorite is one of the tardier early-spring bloomers seldom putting forth its best effort until the end of March or early April.

Among other species of early-flowering shrubs which will later be moved into this planting are:

Winter-hazels (*Corylopsis sinensis* and *C. Veitchiana*).

Witch Hazels (*Hamamelis vernalis* and *H. mollis*).

Purpus Honeysuckle (*Lonicera Purpusii*).

Pussy-willows (*Salix discolor, S. caprea* and *S. gracistyla*).

Persian Ironwood (*Parrotia persica*).

Holly-grapes (*Mahonia Aquifolium* and *M. Bealii*).

Early Rhododendrons (*Rhododendron mucronulatum* and *R. dauricum*).

Fragrant Viburnum (*Viburnum fragrans*).

In close proximity to the species already enumerated will be found such shrubs as the Bridal Wreaths (*Spiraea spp.*) and Forsythias, whose flowering announces the close of winter and the advent of Spring.

It is hoped that visitors to the Arboretum as the days begin to lengthen will enjoy this concentration of hardy pioneers of a new flowering season.

Book Review

GARDEN IN YOUR HOUSE, by Ernesta Drinker Ballard, Foreword by John M. Fogg, Jr. Harper & Brothers, New York, 1958.

This new book, written by Mrs. Ballard, is a reference work on indoor plants designed for the general public. It is divided into four parts. Part I "The Culture of Indoor Plants" deals with caring, potting, watering, fertilization, pest control and propagation, and explains in a non-technical language the basic reasons behind each step by reference to elementary botany. Part II "Some Indoor Gardens," describes different types of window, porch, alcove, cellar, office and store gardens that can be set up in endless variations. Part III "Selection of Plants," the major section of the book, deals with some 500 species and varieties of plans suitable for indoor growing. A great wealth of information on the appearance, uses, and methods of growing of all these plants is to be found. Part IV "Finding Lists" contains lists of plants for various exposures and temperatures, potting mixtures and growing mediums, sources of supply for home plants, and suggested readings for indoor gardeners. There is also a good index.

Mrs. Ballard writes with authority, as she has grown nearly all the plants described therein. The warm personal style makes for smooth enjoyable reading. The book is profusely illustrated with more than 90 half-tone plates.

This volume, based on the author's own observation and experience, stands out refreshingly among the multitude of garden books published each year as one which is original, accurate and reliable. Every grower of indoor plants, professional or amateur, who wants to possess at least one book for reference, should have this one.

H. L. LI

New Associates

The Arboretum is happy to welcome the following new Associates who have been enrolled since September, 1958:

Mr. and Mrs. Baldwin Brown
Mrs. Louis Conseur
Mrs. Bernard Eskin
High Field Elementary School
Miss Barbara Jean Lyon
Mr. and Mrs. Robert L. McNeil, Jr.
Dr. and Mrs. H. F. Parry
Mr. and Mrs. Harold F. Pitcairn
Southampton Nurseries
Mrs. Stewart H. Steffey

Arboretum Activities

(*Continued from Page 54*)

Miss Mary Milton, Propagator, attended the meetings of the Plant Propagators' Society in Columbus, Ohio, from December 3 to 6 and gave an illustrated lecture on "Noteworthy Woody Ornamentals."

Mr. Fred W. Schwoebel, Curator of the Langstroth Bee Garden, has recently returned from four months in Europe where he visited many important botanical gardens in the British Isles, Spain, Switzerland, Germany, Austria and Italy. Mr. Schwoebel made a special study of the cultivated Evodias from the point of view of the beekeeper and prepared a paper on the use of Evodias in the United States for presentation at the International Beekeepers' Congress in Rome in September.

From our Guest Book

Among recent distinguished visitors to the Arboretum who have signed our Guest Book are the following:

Nixon Smiley, Director of the Fairchild Tropical Garden, Miami, Florida.

Walter H. Hodge, Director of Education, Longwood Gardens, Kennett Square, Penna.

Takao Nakamura, Professor of Biochemistry, University of Tokyo, Japan.

Joseph Ewan, Professor of Botany, Tulane University, New Orleans, La.

George Taylor, Director, Royal Botanic Gardens, Kew, England.

Peter Bjejoric, Institute for Plant Protection, Belgrad, Yugoslavia.

Asger F. Langlykke, Squibb Institute for Medical Research, New Brunswick, New Jersey.

Eric Buxton, Plant Pathologist, Rothamsted Experiment Station, Harpenden Herts, England.

Christian Baron, Department of Biochemistry, Institute of Science, Dijon, France.

Grid Markers

Reference has been made before in these notes to the Grid Survey of the Arboretum which was carried out during the summer of 1957. The corners of the grids, each 200 feet on a side, were originally marked with wooden stakes. One of our important projects this autumn has been to replace these stakes with permanent cement markers, sunken into the earth so that the top of each is level with the ground. Each marker bears a symbol, such as A 12 or P 8, which identifies the grid of which it forms the northwest corner.

Transplanting Program

Spring and autumn are, of course, the preferred seasons for transplanting trees and shrubs. Spring is actually a more favorable period for this operation, but since it is also a time when so many other tasks must be performed, we have adopted the practice of moving most of our plants out of the nurseries in the fall.

Most of our efforts this year have been devoted to adding to the representation of certain families and genera which have already been established on the 70-acre area known as Bloomfield, which lies to the north of Northwestern Avenue. Among the genera to which substantial additions have been made from nursery grown stock are *Chionanthus, Lonicera, Viburnum, Hydrangea* and *Berberis.*

Our largest collection of hollies occupies the slope just below the Gates Building. To this planting, which consists primarily of evergreen forms, there have now been added, in groups of three each, three deciduous species: *Ilex geniculata, I. serrata* and *I. verticillata.*

The area directly in front of the Gates Building has been replanted with new foundation material and the lawn behind the building is being converted into an early spring garden. The latter undertaking is described in some detail elsewhere in these pages.

The Herbarium

One of the discouraging features in the maintenance of an herbarium, or collection of pressed and dried plants, is the steady accumulation of unmounted specimens acquired from a variety of sources. The Arboretum herbarium has been no exception to this rule and during the last few years many hundreds of specimens have been piling up in the storage bins. It is a pleasure to be able to report that this mass of unmounted material is now being reduced. Mrs. Joseph N. Du Barry, a volunteer worker, has mounted some 500 sheets in the last year or so and we are deeply grateful to her for her efforts. Mr. Zoltan Porga, a member of our staff, has for some months devoted all of his time to this task, with the result that over 2500 additional sheets have been mounted and incorporated into the herbarium. Included in this total are more than 1200 plants from Formosa, material from India and California, as well as many plants from our local area.

J. M. F., Jr.

Associates' Corner

The Arboretum and the Agricultural Research Service

One of the four Research Laboratories of the United States Department of Agriculture is situated right in our midst at 600 East Mermaid Lane, Wyndmoor, Pennsylvania. Utilization Research, as it is termed, became a recognized program of the U. S. Department of Agriculture in 1938 when, Congress provided for the construction of four new laboratories, one in each major farm-producing area. Our local one was established in 1940.

The work of these laboratories is to find new and wider outlets and markets for farm commodities, especially those in surplus, the utilization and disposal of agricultural wastes, and research on allergens.

In the fundamental studies and research of the Biochemical Section, devoted to honey plants and maple syrup products, the Morris Arboretum has been most helpful, both because of proximity to the raw materials and through the cooperation and botanical knowledge of members of our Staff. Sugar maple trees are not too plentiful in this part of the country, and the laboratories needed a lot of fresh sap. They were able to tap some 50 trees growing around the periphery of the Arboretum, which has vastly improved the gathering, processing and distribution of maple products.

Rutin, a plant drug, used in hemorrhagic and other diseases comes from buds of the Chinese Scholar Tree, *Sophora japonica* L. This used to be imported from China. The Arboretum has a splendid specimen which, since 1950 has been supplying far fresher material.

The twigs and leaves of the Chaste Tree, *Vitex Agnus-castus*, obtained by Dr. J. J. Willaman, in large quantities from the Arboretum, furnished an extract called flavonoid which was sent to the Stanford Medical School for tests against certain viruses.

Nectar from *Evodia Daniellii*, the famous Bee Bee Tree, was gathered from the Langstroth Bee Garden of the Arboretum. The report states that the best way to obtain this nectar is, to let the bees collect from the flowers and then squeeze the bees! I wonder who does the squeezing?

Alkaloids are known for their physiological activity, and have many medical uses such as in hypertension and malaria. Numerous plants of the Solanaceae or Nightshade Family contain alkaloids. Dr. T. D. Fontaine obtained two species of *Solanum* from our collections, one of which had a very high alkaloid content.

Red sour cherries are another fruit that is somewhat infrequent in these parts. Dr. R. T. Whittenberger needed fresh fruit direct from the tree. Again the Arboretum came to the rescue.

Just recently Dr. R. L. Pollack needed some fruits with sizable seeds and fleshy pulp. Dr. Fogg took him on a tour of the grounds and they found ten species which would meet the requirements including, of all things, the smelly Ginkgo by the front door of the old mansion.

One of the researches, which appeals to us gardeners, is the study of various plant-growth regulators (including weed killers).

Some uncultivated plants are used for the study of cortisone, used in the treatment of arthritis and related conditions.

As the Research Laboratory Library does not include works on botany the scientists at the Laboratory make frequent use of the Arboretum Library. In return for the Arboretum's cooperation, hybrid seed, produced by Drs. J. W. Wright and E. J. Schreiner of the U. S. Forest Service working at the Arboretum, were stored in a constant temperature refrigerator at the Laboratory and Dr. Willaman's compilation of alkaloid-bearing plants was placed at the disposal of Drs. Fogg and Li. Several members of the Research Staff are included in the roster of Arboretum Associates and Dr. J. J. Willaman, Director of the Biochemical Department, is on our Advisory Council.

Marion W. Rivinus

Library Accessions

The following items have been added to the Arboretum Library during 1958:

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Flora of the Malay Peninsula. 5 vols. H. N. Ridley. London. 1922-25.

Flora y Fauna del Estado Libre y Soberano de Oaxaca. M. M. Gracida Oaxaca. 1891.

Forest Fertilization. A bibliography, with abstracts, on the use of fertilizers and soil amendments in forestry. Compiled by D. P. White and A. L. Leaf. Syracuse, N. Y. 1957.

Hawaiian Flowers and Flowering Trees. L. E. Kuck & R. C. Tongg. Chas. E. Tuttle Co. 1958.

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Native Trees of Florida. E. West and L. E. Arnold. Univ. Florida Press. 1956.

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*Rhododendrons 1956. American Rhododendron Society. Portland, Ore. 1956.

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Tray Landscapes. S. Yanagisawa. Tourist Library vol. 19. Tokyo. 1955.

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Tree Identification Book. G. W. D. Symonds. Barrows & Co. 1958.

Trees of the Western Pacific Region. J. H. Kraemor, West Lafayette, Ind. 1951.

Vegetacion en los alrededores de la Capital de Mexico. C. Reiche. Mexico. 1914.

Your Florida Garden. J. V. Watkins & H. S. Wolfe. Gainesville, Fla. 1956.

* Gift of Mrs. William A. Kelius.

Index To Volume IX

Nos. 1-4, INCLUSIVE (1958)

	Page
Abies Veitchii	35
Acer palmatum	44
Aconite	48
Agaric, Honey	62
Agaricus campestris	62
Allison, P.	10-12, 36, 47-48, 60-63
Almond	64
Amanita, caesarea	61
Amanita muscaria	61, 62
Amanita pantherina	61, 62
Amanita phalloides	61, 62
Amanita rubescens	61, 62
Amanita verna	61, 62
Amanita virosa	61, 62
Andromeda, Japanese	63
Anthracnose	48
Arboretum Activities	2, 18, 38, 54
Armillaria mellea	62
Aspen, Chinese	4
Aspen, European	4
Aspergillus	63
Associates	2
Associates Corner	50, 66
Basswood	39
Bastwood	39
Beauty Bush	35
Bee-Tree	39
Berberis	65
Big Tree	59
Blister Rust, White Pine	46
Bodai	42
Bodhi Tree	41, 42
Bohdiruma	41
Boletus edulis	62
Boletus mineato-olivaceus	61, 62
Boletus parasiticus	63
Boletus satanus	61, 62
Bridal Wreath	64
Cambridge University Garden	58
Camellia japonica	60
Cantharellus cibarius	62
Carpinus Betulus	59
Cascara	48
Cedar, Atlas	35, 56, 59
Cedar of Lebanon	56, 59
Chaenomeles japonica	64
Chaenomeles lagenaria	64
Chaenomeles superba	64
Chamaecyparis	35
Chanterelle	62
Characteristics and Identification of the Soft Pines Cultivated in the Philadelphia Area	19-30, 45-47
Chaste Tree	66
Cherry, Cornelian	63
Cherry, Japanese Cornelian	63
Chimonanthus praecox	63
Chionanthus	65
Chosenia	3
Clavaria	62
Claviceps purpurea	62
Clitocybe illudens	61, 62
Clitocybe morbifera	61
Clitocybe multiceps	62
Clitocybe nebulosus	61
Coccidioides immitis	63
Collibia velutipes	62
Conophthorus coniperda	46
Coprinus atramentarius	62
Coprinus comatus	62
Coprinus micaceus	62
Cornus mas	63
Cornus officinalis	63
Corylopsis sinensis	64
Corylopsis spicata	63
Corylopsis Veitchiana	64
Cottonwood	4
Cottonwood, American	9
Crocus	59
Cronartium ribicola	46
Cultivated Lindens	39-44
Cypress, Swamp	56
Digitalis	48
Dioryctria	46
Early flowering Shrub Garden	63, 64
Edinburgh Garden	57
Elm, Chinese	35
Elm, Siberian	35
Entoloma lividum	61, 62
Entoloma sinuatum	61
Ephedra	59
Eucalyptus	48
Evodia Daniellii	66
Fertilizing Trees and Shrubs	31-35
Ficus religiosa	41
Fistulina hepatica	62
Flower Show Exhibit	13
Fogg, J. M., Jr.	63, 64
Forsythia	64
Galerina autumnalis	62
Gardel—A good sign of the times	36
Garden in Your House ..... A Review	64
Garrya	59
Gaylussacia brachycera	50
Ginkgo biloba	56
Grid Markers	65
Hamamelis japonica	63
Hamamelis mollis	64
Hamamelis vernalis	64
Hamamelis virginiana	63
Hebeloma	61
Helvella esculenta	61, 62
Herbarium	65
Holly-grape	64
Honeysuckle, Early	63
Honeysuckle, Purpus	64
Honeysuckle, Standish	63

Page

Honeysuckle, Winter 63
Hornbean, European 59
Huckleberry, Box 50
Hydnum 62
Hydrangea 65
Hygrophorus conicus 61, 62
Hypholoma 62
Hypoderma desmazierii 46
Ilex geniculata 65
Ilex serrata 65
Ilex verticillata 65
Ink cap, Common 62
Ink cap, Shiny 62
Inocybe infelix 61, 62
Inocybe infida 61, 62
Ironwood, Persian 64
Jasmine, Winter 63
Jasminum nudiflorum 63
Juniperus phoenicea 59
Kew Gardens 55
Kolkwitzia 35
Lactarius deliciosus 62
Lactarius torminosus 61, 62
Leaf spot fungus 48
Lepiota Morgani 62
Lepiota procera 62
Leucothoe 48
Library Accessions 67
Li, H. L. 3-9, 39-44, 55-60, 64
Lindera Benzoin 63
Lime 39
Lindens, The Cultivated 39-44
Linde, Hollandische 40
Linden, American 42
Linden, Common 39, 44
Linden, Manchurian 40
Linden, Small-leaved 39
Linden, Large-leaved 39
Linn 39
Liriodendron 39
Locust, Black 56
Lombardy Poplar 3-9
Lonicera fragrantissima 63
Lonicera Purpusii 64
Lonicera Standishii 63
Mahonia Aquifolium 64
Mahonia Bealii 64
Maple Check List. A review 44
Maple, Sugar 66
Marasmius oreades 62
March storm 18
Medicinal Garden 48
Meratia praecox 63
Milton, M. O. 31-35
Morchella esculenta 62
Morel 62
Mushroom, Beefsteak 62
Mushroom, Common 62
Mushroom, Oyster 62
Mushroom, Parasol 62
Mushroom, Violet-stemmed 62
New Associates 51, 64
Nux Vomica 48
Nyctalis 63
Oak, Chestnut 25

Page

Open House 38
Osier, Common 4
Osier, Purple 4
Pachysandra 48
Panaeolus campanulatus 62
Panaeolus papilionaceus 62
Panaeolus retirugis 62
Parrotia persica 64
Penicillium 63
Pesticide Choice 10-12
Pholiota autumnalis 62
Picea Maximowiczii 35
Pieris japonica 63
Pine, Armand 19, 26, 47
Pine, Border White 25
Pine, Bristlecone 19, 25
Pine, Chiapas White 26
Pine, Dwarf Stone 19, 45
Pine, Eastern White 19, 26, 45, 46
Pine, Formosan White 25
Pine, Foxtail 25
Pine, Gerard 20, 25
Pine, Himalayan White 19, 20, 23, 27, 45, 47
Pine, Japanese White 19, 27, 45
Pine, Korean White 19, 20, 28, 45, 47
Pine, Lacebark 19, 23, 28, 45, 46
Pine, Limber 19, 28, 45
Pine, Macedonian White 19, 29, 45, 46
Pine, Mexican White 19, 25, 45
Pine, Nelson 25
Pine, Pince 25
Pine, Pinyon 20, 25, 29
Pine, Scotch 46
Pine, Stone 56
Pine, Sugar 19, 25, 45, 47
Pine, Swiss Stone 19, 29, 45, 47
Pine, Western White 19, 30, 45, 46, 47
Pine, Weymouth 26
Pine, Whitebark 25
Pinus albicaulis 21, 23, 24, 25
Pinus aristata 19, 22, 23
Pinus Armandi 19, 21, 23, 26
Pinus ayachahuite 19, 21, 22, 23, 24, 29
Pinus ayachahuite × *Griffithii* 24
Pinus ayachahuite × *Strobus* 24
Pinus Balfouriana 22, 23, 25
Pinus Bungeana 19, 22, 23, 28
Pinus Cembra 19, 21, 22, 24, 29, 48
Pinus cembroides 20, 22, 25
Pinus cembroides var. *monophylla* 59
Pinus edulis 22, 23, 25, 29
Pinus flexilis 19, 21, 23, 24, 28
Pinus flexilis var. *reflexa* 25
Pinus flexilis × *Griffithii* 24
Pinus formosana 21, 24, 25
Pinus Gerardiana 20, 22
Pinus Griffithii 19, 21, 22, 24, 27
Pinus koraiensis 19, 21, 22, 24, 28
Pinus Lambertiana 19, 21, 22, 24
Pinus monophylla 22, 23, 25, 29, 59
Pinus monticola 19, 21, 22, 24, 30
Pinus Nelsoni 22, 25
Pinus parviflora 19, 21, 22, 24, 27
Pinus Peuce 19, 21, 22, 24, 29
Pinus Pinceana 22, 25

Page

Pinus Pinea ... 56
Pinus pumila ... 21, 22, 24, 25
Pinus quadrifolia ... 22, 23, 25
Pinus reflexa ... 25
Pinus strobiformis ... 21, 23, 24, 25
Pinus Strobus ... 19, 21, 23, 24, 26
Pinus Strobus var. *chiapensis* ... 24, 26
Pinus Strobus var. *nana* ... 19
Pinus Strobus × *monticola* ... 24
Pissodes strobi ... 46
Plant Distribution ... 48
Pleurotus ostreatus ... 62
Pole blight (of pine) ... 46
Poplar, Black ... 3, 4, 7
Poplar, Black cv. 'Plantierensis' ... 8
Poplar, Chinese White ... 4
Poplar, Cypress ... 7
Poplar, Dawny Black ... 8
Poplar, European Black ... 4, 9
Poplar, Gray ... 4
Poplar, Lombardy ... 3, 9
Poplar, White ... 4
Populus adenophora ... 3, 9
Populus alba ... 4
Populus × *canadensis* ... 4, 9
Populus canescens ... 4
Populus deltoides ... 4, 9
Populus dilatata ... 8
Populus euphratica ... 4, 5
Populus fastigata ... 8
Populus italica ... 8
Populus Maximowiczii ... 4
Populus nigra ... 4, 7, 9
Populus nigra cv. 'Italica' ... 8
Populus nigra var. *italica* ... 7, 8
Populus pyramidalis ... 8
Populus Simonii ... 4
Populus tomentosa ... 4
Populus tremula ... 4
Powdery mildew ... 48
Primula ... 57
Prunus Amygdalus ... 64
Prunus avium ... 59
Prunus Davidiana ... 59
Psalliota campestris ... 62
Pterocarya fraxinifolia ... 59
Puffball ... 62
Pussy-Willow ... 64
P'u t'i shu ... 41
Quercus prinus ... 25
Quince, Japanese ... 64
Quinine ... 48
Rauwolfia ... 48
Recreation Area ... 49
Redwood ... 59
Rhododendron ... 57, 64
Rhododendron Society, Local Chapter ... 13
Rhododendron dauricum ... 64
Rhododendron mucronulatum ... 64
Rhodophyllus lividus ... 61
Rhodophyllus sinuatus ... 61
Ribes ... 46
Rivinus, Marion W. ... 50, 66
Russula emetica ... 62

Page

Salix alba ... 4, 7
Salix alba var. *tristis* ... 4
Salix amygdalina ... 4
Salix babylonica ... 4
Salix × *blanda* ... 7
Salix bracteosa ... 3
Salix caprea ... 4, 64
Salix cinerea ... 4
Salix discolor ... 4, 64
Salix × *elegantissima* ... 7
Salix fragilis ... 4, 7
Salix gracilistyla ... 64
Salix Matsudana ... 4, 5
Salix nigra ... 4
Salix pentandra ... 4
Salix petiolaris ... 4
Salix purpurea ... 4
Salix repens ... 4
Salix sepulcralis ... 7
Salix sericea ... 4
Salix viminalis ... 4
Sapindus mukrossia ... 42
Scholar Tree, Chinese ... 56, 66
Seed exchange ... 12
Seeds received ... 36
Shaggy Mane ... 62
Shrub Garden, Early-flowering ... 63
Solanum ... 66
Sophora japonica ... 56, 66
Spice Bush ... 63
Spiraea ... 64
Summer Course ... 49
Survey of Unusual Growing Season, 1958 ... 47-48
Three Botanical Gardens of Britain ... 55-60
Thuja ... 35
Tiglio ... 39
Tilia americana ... 42
Tilia cordata ... 39, 40
Tilia dasystyla ... 40
Tilia europaea ... 39, 40, 44
Tilia floridana ... 43
Tilia heterophylla ... 43
Tilia heterophylla var. *Michauxii* ... 43
Tilia hollandica ... 40
Tilia hybrida ... 40
Tilia intermedia ... 40
Tilia mandshuria ... 41
Tilia Miqueliana ... 41
Tilia monticola ... 43
Tilia neglecta ... 43
Tilia petiolaris ... 40
Tilia platyphyllos ... 39, 40
Tilia platyphyllos var. *laciniata* ... 40
Tilia tomentosa ... 40
Tilia Tuan ... 41
Tilia vulgaris ... 40
Tilia × *euchlora* ... 44
Tilia × *flaccida* ... 44
Tilia × *flavescens* ... 44
Tilia × *Juranyana* ... 44
Tilia × *Moltkei* ... 44
Tilia × *orbicularis* ... 44
Tilio ... 39
Tilleul ... 39

	Page
To Eat or Not to Eat	60-63
Trachycarpus excelsa	59
Transplanting Program	65
Tricholoma personatum	62
Tuan	39
Tulip-tree	39
Ulmus parvifolia	35
Ulmus pumila	35
Valerian	48
Viburnum fragrans	64
Vinca	48
Visitors to the Arboretum	65
Vitex agnus-castus	66
Weeping Willow and Lombardy Poplar	3-9
Weevil, White Pine	46
Whitewood	39
Willow, Almond-leaved	4
Willow, Basket	4
Willow, Bay	4
Willow, Black	4
Willow, Crack	4, 7
Willow, Creeping	4
Willow, Goat	4
Willow, Gray	4
Willow, Oriental	6
Willow, Pussy	4, 64
Willow, Silky	4
Willow, Thurlow Weeping	7
Willow, Weeping	3-9
Willow, White	4
Willow, Wisconsin Weeping	7
Wing-nut, Caucasian	59
Winter-hazel	63, 64
Wintersweet	63
Witch Hazel	48, 63, 64
Witch-hazel, Japanese	63
Wright, J. W.	19-30, 45-47